



# **E-BAM PLUS User 7500 SPECIFICATION**



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## 1. Overview

This document describes the implementation of the 7500 protocol used in E-BAM PLUS.

## 2. Instrument Communication Modes

### 2.1. Overview

There are three modes of communication:

1. User communication – This is a user interactive mode using simple letter commands for ease of use.
2. Computer communication – This mode is used for computer-to-device communication. It includes a level of data integrity.
3. Network communication – This mode is used for computer-to-device communication with more than one device on a network.

### 2.2. User Communication

In the user communication mode (terminal mode), the user simply presses the Enter key, <cr>, three times to enter the mode. In this mode simple character commands can be issued with no <Esc> character required.

An asterisk character appears when entering terminal mode, and also after a command has completed. The asterisk indicates that the instrument is ready for a new command. Commands are echoed back from the instrument in this mode.

Pressing <Esc> or Q<cr> will exit terminal mode.

### 2.3. Computer Communication

In the computer communication mode the command format include a level of data integrity – checksum.

This mode is entered whenever an <Esc> character is sent to the instrument.

Character echo is suppressed in this mode.

### 2.3.1. Computer Command Format

The computer command has the following format:

```
<Esc>Cmd p1 p2*cs<cr>
```

Computer commands are prefaced with an <Esc> (0x1B) character followed directly by a command, Cmd, which is variable in length depending on the command. After the command characters there can be zero or more parameter fields, p1 p2. Each parameter field is delimited by one or more Space characters (0x20). The end of the message is signaled by the Checksum Delimiter character \* (0x2A) followed by the checksum, cs, and finally terminated with a carriage return <cr> (0x0D) character.

A computer command example follows:

```
<Esc>RV 1*1234<cr>
```

All command responses are terminated with a checksum

```
RV 1 E-BAM PLUS, 82102, R1.0.0*01563<cr><lf>
```

### 2.3.2. Checksum Computation

Checksum is calculated as the 16 bit unsigned integer sum of all of the characters after the <Esc> character up to but not Including the Checksum Delimiter Character \* (0x2A). It is printed out as an ASCII decimal number.

The result is always 5 characters in length with leading zeros.

The checksum may be bypassed in the following manner: \*//<cr>.

## 2.4. Network Communication

Refer to the 7500 Network Protocol Specification.

### 3. Command Summary

#### 3.1. Command List

| Command | Description                                      |
|---------|--------------------------------------------------|
| #       | Request MetRecord Revision                       |
| 1       | Request settings report                          |
| 2       | Request All User data report                     |
| 3       | Request New User data report                     |
| 4       | Request Last User data report                    |
| 7       | Request Alarm report                             |
| C       | Clear data log file                              |
| D       | Get/Set date part of the real time clock         |
| H       | Help menu                                        |
| K       | Get/Set the Factory K-Factor Calibration         |
| Q       | Quit out of terminal mode                        |
| T       | Get/Set time part of the real time clock         |
| AR      | Get/Set analog output range                      |
| CA      | Clear the Alarm log                              |
| CO      | Get/Set analog concentration offset              |
| CR      | Get/Set analog concentration range               |
| CT      | Get/Set concentration type                       |
| CU      | Get/Set concentration units                      |
| DS      | Report data log channel descriptors              |
| DT      | Get/Set the date and time of the real time clock |
| HS      | Get/Set Ethernet flow control                    |
| ID      | Get/Set location ID or address                   |
| MA      | Get/Set Modbus Slave Address                     |
| NW      | Set Network Mode                                 |
| OI      | Get output interval                              |
| OP      | Get/Set operation command                        |
| PM      | Get/Set PM Inlet type                            |
| PR      | Print report                                     |
| PW      | Unlock protected commands                        |

|         |                                          |
|---------|------------------------------------------|
| QH      | Report current readings header           |
| RQ      | Report current readings without header   |
| RS      | Request settings report                  |
| RV      | Report Model/Part/Revision               |
| SB      | Get/Set baud rate                        |
| SS      | Get Met One serial number                |
| ST      | Get/Set sample time (data log period)    |
| TS      | Get/Set timestamp mode                   |
| UN      | Get/Set data log channel units           |
| AIR     | Get/Set AIRSIS protocol enable           |
| SPW     | Get/Set user password                    |
| TZO     | Get/Set time zone offset                 |
| XRF     | Xmodem read file                         |
| XRD     | Get Xmodem record descriptor report      |
| BKGD    | Get/Set background offset                |
| FTSP    | Get/Set filter temperature set point     |
| SPAN    | Get/Set mass span audit                  |
| STDT    | Get/Set standard temperature             |
| TPER    | Get/Set tape advance period              |
| DSCRC   | Get the data log channel descriptors CRC |
| MODEM   | Get/Set Cloud Modem mode                 |
| RTPER   | Get/Set real-time average period         |
| TPRES   | Get/Set tape advance pressure            |
| XRDCRC  | Get Xmodem record descriptor CRC         |
| CLKSYNC | Get/Set Clock Sync mode                  |

## 4. E-BAM PLUS Commands

The command and responses shown below are for computer mode unless otherwise noted. User mode responses are more verbose and similar in nature.

### 4.1. # – Request MetRecord Revision

| Command | Description                     |
|---------|---------------------------------|
| #       | Request the MetRecord Revision. |

| Response | Description                                                                              |
|----------|------------------------------------------------------------------------------------------|
| # 7500 r | 7500 – This document number<br>r – The revision of this document implemented in firmware |

| Example                   |
|---------------------------|
| #<cr><br># 7500 C<cr><lf> |

## 4.2. 1 – Report Settings

| Command | Description          |
|---------|----------------------|
| 1       | Report the settings. |

| Response                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <pre>E-BAM PLUS Settings Report 2017-01-17 14:58:36      Firmware, 82102, R1.1.2       CPLD, 81699, R1.0.0     Display, 82451, R1.0 Digital Sen 1, 597, 10503-01, R01.0.0 Digital Sen 2, MSO, 10463-03, R1.1.0  Serial Number, U16264   Location, 1   Baud Rate, 9600 Ethernet FlowControl, NONE   AIRSIS, OFF   Data Average, 1 HR RealTime Period, 60   Tape Period, 1 HR   Tape Pressure, 250   Standard Temp, 25 C   PM Inlet Type, PM2.5     Conc Type, ACTUAL       K, 1.063     Background, 0.0017       Usw, 0.325     Audit Span, 0.789     Conc Units, ug/m3       USB Days, 14       USB Files, ALL Analog Range 1, 0-5.0 V Analog Range 2, 0-5.0 V   Conc Span, 1000 ug/m3   Conc Offset, 0 ug/m3 Hourly Timestamp, ENDING   FT Set Point, 40.0     FT P-Gain, 0.500     FT I-Gain, 0.300 RealTime Alpha, 0.2316 RealTime Gamma, 0.1500   Beep Volume, 100 ModBus Address, 1   Byte Order, 512   Factory Mode, OFF Flow 1 P-Gain, 10000.000 Flow 1 I-Gain, 5000.000 Flow 2 P-Gain, 10000.000</pre> |

Flow 2 I-Gain, 5000.000  
Cloud Modem, NONE  
Time Zone, UTC -01:00  
Clock Sync, NONE

| Name,  | Offset, | Slope |
|--------|---------|-------|
| FLOW1, | 0.000,  | 1.000 |
| FLOW2, | 0.000,  | 1.000 |
| AT,    | -1.130  |       |
| BP,    | -2.020  |       |
| FT,    | 0.000   |       |
| UPPER, | -1.119  |       |
| LOWER, | -0.687  |       |
| FRH,   | 0.000   |       |

DAC Cal 1, 0.0,6,5.0,52771  
DAC Cal 2, 0.0,34,5.0,52849

#### 4.3. 2 – Report All Data

| Command | Description                                                                |
|---------|----------------------------------------------------------------------------|
| 2       | Report all the data.<br>The 2 command always sends the data in CSV format. |

Header Response: A report header is present for the CSV format when execute from terminal mode. It is suppressed in computer mode.

```
Data Report
2016-01-25 16:15:09
Location, 1, U16264

Time,ConcRT (ug/m3) ,ConcHR (ug/m3) ,Flow (lpm) ,WS (m/s) ,WD (Deg) ,AT (C) ,RH (%) ,BP (mmHg) ,FT (C) ,FRH (%) ,BV (V) ,
PM,Status
```

#### 4.4. 3 – Report New Data

| Command | Description                                 |
|---------|---------------------------------------------|
| 3       | Report the new data since the last request. |

Response:

The response is the same as the 2-command.

#### 4.5. 4 – Report Last Data

| Command | Description                                                                                        |
|---------|----------------------------------------------------------------------------------------------------|
| 4       | Report the last data record.                                                                       |
| 4 0     | Report all the data records.                                                                       |
| 4 -1    | Report the new data records since the last request.                                                |
| 4 n     | Report the last <i>n</i> hours where <i>n</i> is less than or equal to 2000.                       |
| 4 ts    | Request the last data since timestamp, where <i>ts</i> has the format <i>yyyy-MM-dd HH:mm:ss</i> . |

Response:

The response is the same as the 2-command.

#### 4.6. 7 – Report Alarm Events

| Command | Description             |
|---------|-------------------------|
| 7       | Report all alarm events |

##### Response:

Alarm Report

2016-01-25 17:10:19

Location, 1, U16264

Time, Alarm

2016-01-25 17:10:02, TAPE BREAK, 12  
2016-01-25 17:10:02, BETA DETECTOR, 500  
2016-01-25 17:10:02, SENSOR RANGE, FLOW1, 0.0  
2016-01-25 17:10:02, SENSOR RANGE, FLOW2, 0.0  
2016-01-25 17:10:02, SENSOR RANGE, WS, 0.0  
2016-01-25 17:10:02, SENSOR RANGE, WD, 0.0  
2016-01-25 17:10:02, SENSOR RANGE, AT, -50.0  
2016-01-25 17:10:02, SENSOR RANGE, RH, 0.0  
2016-01-25 17:10:02, SENSOR RANGE, BP, 375.0  
2016-01-25 17:10:02, SENSOR RANGE, UPPER, 228.0  
2016-01-25 17:10:02, SENSOR RANGE, LOWER, 228.0  
2016-01-25 17:10:02, SENSOR RANGE, FT, -40.0  
2016-01-25 17:10:02, SENSOR RANGE, FRH, 0.0  
2016-01-25 17:10:02, SENSOR RANGE, BOX, -40.0  
2016-01-25 17:10:02, SENSOR RANGE, BV, -1.0  
2016-01-25 17:10:02, SENSOR RANGE, FLOW, 0.0  
2016-01-25 17:10:02, SENSOR RANGE, BETA, 500.0  
2016-01-25 17:10:02, SENSOR RANGE, FLOW1, 200.0  
2016-01-25 17:10:02, SENSOR RANGE, FLOW2, 6.0  
2016-01-25 17:10:02, SENSOR RANGE, WS, 50.0  
2016-01-25 17:10:02, SENSOR RANGE, WD, 360.0  
2016-01-25 17:10:02, SENSOR RANGE, AT, 70.0  
2016-01-25 17:10:02, SENSOR RANGE, RH, 100.0  
2016-01-25 17:10:02, SENSOR RANGE, BP, 825.0  
2016-01-25 17:10:02, SENSOR RANGE, UPPER, 818.0  
2016-01-25 17:10:02, SENSOR RANGE, LOWER, 818.0  
2016-01-25 17:10:02, SENSOR RANGE, FT, 60.0  
2016-01-25 17:10:02, SENSOR RANGE, FRH, 98.9  
2016-01-25 17:10:02, SENSOR RANGE, BOX, 60.0  
2016-01-25 17:10:02, SENSOR RANGE, BV, 16.0  
2016-01-25 17:10:02, SENSOR RANGE, FLOW, 20.0

|            |          |              |             |            |
|------------|----------|--------------|-------------|------------|
| 2016-01-25 | 17:10:02 | SENSOR RANGE | BETA        | 20000.0    |
| 2016-01-25 | 17:10:02 | TAPE ADVANCE |             | 250.0      |
| 2016-01-25 | 17:10:02 | FLOW FAILURE | 0.0         | 0.0        |
| 2016-01-25 | 17:10:02 | VANE FAILURE | UP          |            |
| 2016-01-25 | 17:10:02 | VANE FAILURE | DOWN        |            |
| 2016-01-25 | 17:10:02 | VANE FAILURE | FOIL INSERT |            |
| 2016-01-25 | 17:10:02 | DIGITAL LINK | DOWN        |            |
| 2016-01-25 | 17:10:02 | POWER OUTAGE | Off         | 0.00:03:30 |
|            |          |              | On          | 0.01:33:09 |
| 2016-01-25 | 17:10:02 | MAINTENANCE  |             |            |

#### 4.7. C – Clear Data Log

| Command | Description         |
|---------|---------------------|
| C Y     | Clear the data log. |

| Response |
|----------|
| C Y      |

| Example                |
|------------------------|
| C Y<cr><br>C Y<cr><lf> |

#### 4.8. D – Request or Set the Date Only

| Command              | Description                                   |
|----------------------|-----------------------------------------------|
| D                    | Request the date part of the real time clock. |
| D <u>yyyy</u> -MM-dd | Set the date part of the real time clock.     |

| Response             |
|----------------------|
| D <u>yyyy</u> -MM-dd |

| Parameter   | Description       |
|-------------|-------------------|
| <u>yyyy</u> | Years 2000 – 2037 |
| MM          | Months 1 – 12     |
| dd          | Days 1 – 31       |

| Example                                                                       |
|-------------------------------------------------------------------------------|
| D<cr><br>D 2013-01-08<cr><lf><br><br>D 2013-01-08<cr><br>D 2013-01-08<cr><lf> |

#### 4.9. H – Help Menu

| Command | Description           |
|---------|-----------------------|
| H       | Report the help menu. |

| Response                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>E-BAM PLUS Help Menu</p> <ul style="list-style-type: none"><li>1 - Report Settings</li><li>2 - Report All Data</li><li>3 - Report New Data</li><li>4 - Report Last Data</li><li>7 - Report Alarm Log</li><li>C - Clear Data Log</li><li>D - Set Date</li><li>T - Set Time</li><li>CA - Clear Alarm Log</li><li>DT - Set Date/Time</li><li>QH - Report Data Record Header</li><li>RV - Report Model/Part/Revision</li><li>RQ - Report Current Readings</li></ul> |

#### 4.10. K – Request or Set the Factory K-Factor Calibration

**Warning:** You should only change the factory K-factor under advice from the factory. Changing the K-factor will invalidate the factory calibration.

| Command | Description                                                       |
|---------|-------------------------------------------------------------------|
| K       | Request the factory k-factor calibration                          |
| K n     | Set the factory k-factor calibration, where n is from 0.8 to 1.2. |

| Response | Description                                  |
|----------|----------------------------------------------|
| K n      | n – the factory k-factor calibration setting |

| Example                                                                                           |
|---------------------------------------------------------------------------------------------------|
| <pre>K&lt;cr&gt; K 1.000&lt;cr&gt;&lt;lf&gt;  K 1.101&lt;cr&gt; K 1.101&lt;cr&gt;&lt;lf&gt;</pre> |

#### 4.11. Q – Exit User Mode

| Command | Description                             |
|---------|-----------------------------------------|
| Q       | Exit User mode and enter Computer mode. |

| Response             | Description                 |
|----------------------|-----------------------------|
| Q Exit Terminal Mode | The command was successful. |

| Example                               |
|---------------------------------------|
| Q<cr><br>Q Exit Terminal Mode<cr><lf> |

#### 4.12. T – Request or Set the Time Only

| Command    | Description                                   |
|------------|-----------------------------------------------|
| T          | Request the time part of the real time clock. |
| T HH:mm:ss | Set the time part of the real time clock.     |

| Response   | Description                                                                                                                      |
|------------|----------------------------------------------------------------------------------------------------------------------------------|
| T HH:mm:ss | HH – Hours 0 – 23.<br>mm – Minutes 0 – 59.<br>ss – Seconds 0 – 59, this parameter is optional. When omitted the value will be 0. |

| Example                                                                 |
|-------------------------------------------------------------------------|
| T<cr><br>T 13:18:38<cr><lf><br><br>T 14:13:12<cr><br>T 14:13:12<cr><lf> |

#### 4.13. AR – Request or Set the Analog Output Range

| Command | Description                                                                                                                             |
|---------|-----------------------------------------------------------------------------------------------------------------------------------------|
| AR      | Request the analog output range.                                                                                                        |
| AR 0    | Request the number of analog output channels                                                                                            |
| AR c e  | Set the analog output range where c is the channel number and e is the enumerator for values 0-0-1.0 V, 1-0-2.5 V, 2-0-5.0 V, 3-4-20 mA |

| Responses | Description                                                                             |
|-----------|-----------------------------------------------------------------------------------------|
| AR c      | c – the number of analog output channels                                                |
| AR c,e-v  | c – the channel number<br>e – the enumerator value<br>v – the analog output range value |

| Example                                                                                                                                |
|----------------------------------------------------------------------------------------------------------------------------------------|
| AR<cr><br>AR 1,2-0-5.0 V<cr><lf><br>AR 2,2-0-5.0 V<cr><lf><br><br>AR 0<cr><br>AR 2<cr><lf><br><br>AR 2 2<cr><br>AR 2,2-0-5.0 V<cr><lf> |

#### 4.14. CA – Clear Alarm Log

| Command | Description          |
|---------|----------------------|
| CA Y    | Clear the alarm log. |

| Response |
|----------|
| CA Y     |

| Example                  |
|--------------------------|
| CA Y<cr><br>CA Y<cr><lf> |

#### 4.15. CO – Request or Set the Concentration Offset

| Command | Description                                                                                         |
|---------|-----------------------------------------------------------------------------------------------------|
| CO      | Request the concentration offset.                                                                   |
| CO e    | Set the concentration offset, where e is 0--15 ug/m3, 1--10 ug/m3, 2--5 ug/m3, 3-0 ug/m3, 4-5 ug/m3 |

| Response | Description                                                        |
|----------|--------------------------------------------------------------------|
| CO e-V   | e – The enumerator setting.<br>V – The concentration offset value. |

| Example                                                                |
|------------------------------------------------------------------------|
| CO<cr><br>CO 1-0 ug/m3<cr><lf><br><br>CO 4<cr><br>CO 4-5 ug/m3<cr><lf> |

#### 4.17. CR – Request or Set the Concentration Range

| Command | Description                                                                                                                             |
|---------|-----------------------------------------------------------------------------------------------------------------------------------------|
| CR      | Request the concentration range.                                                                                                        |
| CR e    | Set the concentration offset, where e is 0-100 ug/m3, 1-200 ug/m3, 2-500 ug/m3, 3-1000 ug/m3, 4-2000 ug/m3, 5-5000 ug/m3, 6-10000 ug/m3 |

| Response | Description                                                       |
|----------|-------------------------------------------------------------------|
| CR e-V   | e – The enumerator setting.<br>V – The concentration range value. |

| Example                                                                       |
|-------------------------------------------------------------------------------|
| CR<cr><br>CR 6-10000 ug/m3<cr><lf><br><br>CR 4<cr><br>CR 4-2000 ug/m3<cr><lf> |

#### 4.18. CT – Request or Set the Concentration Type

| Command | Description                                                  |
|---------|--------------------------------------------------------------|
| CT      | Request the concentration type.                              |
| CT e    | Set the concentration type, where e is 0-ACTUAL, 1-STANDARD. |

| Response  | Description                                                        |
|-----------|--------------------------------------------------------------------|
| CT e-name | e – The enumerator setting.<br>name – The concentration type name. |

| Example                                                                                                   |
|-----------------------------------------------------------------------------------------------------------|
| <pre>CT&lt;cr&gt; CT 0-ACTUAL&lt;cr&gt;&lt;lf&gt;  CT 1&lt;cr&gt; CT 1-STANDARD&lt;cr&gt;&lt;lf&gt;</pre> |

#### 4.19. CU – Request or Set the Count Units

| Command | Description                                              |
|---------|----------------------------------------------------------|
| CU      | Request count unit setting.                              |
| CU e    | Set the count unit setting, where e is 0-ug/m3, 1-mg/m3. |

| Response  | Description                                          |
|-----------|------------------------------------------------------|
| CU e-unit | e – The enumerator setting.<br>unit – The unit name. |

| Example                                                            |
|--------------------------------------------------------------------|
| CU<cr><br>CU 0-ug/m3<cr><lf><br><br>CU 1<cr><br>CU 1-mg/m3<cr><lf> |

## 4.20. Field Descriptors

Retrieval commands are used to query the instrument for Descriptor Information Table. These commands can be accessed by any serial device such as a data logger or software.

Information can be retrieved in either in single line responses or in bulk. Single line responses are needed for devices with limited serial input buffer sizes.

### 4.20.1. DS 0 – Query Abbreviated Descriptor Information

| Command | Description                                          |
|---------|------------------------------------------------------|
| DS 0    | This command returns the general header information. |

| Response  | Description                                                                                                                                                                             |
|-----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| DS n,id,r | The response will indicate the general descriptor information.<br>n – Number of field descriptor lines available.<br>id – Location ID<br>r – Reserved for future use. 0 is the default. |

| Example                         |
|---------------------------------|
| DS 0<cr><br>DS 14,001,0<cr><lf> |

#### 4.20.2. DS c – Specific Descriptor Information

| Command | Description                                                                                                              |
|---------|--------------------------------------------------------------------------------------------------------------------------|
| DS c    | This command returns the specific channel header information in the Descriptor Information Table.<br>c – Channel number. |

| Response                                           |
|----------------------------------------------------|
| DS c,FieldName,MeasureType,units,prec,math,max,min |

| Parameter   | Description                                                                                                                                        |
|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------|
| c           | Field number – 1 based.                                                                                                                            |
| FieldName   | Field name string in printable ASCII.<br>This is the user selected name for the measurement.<br>Example: AT1 for air temp, FT1 for flow temp, etc. |
| MeasureType | Measurement type string in printable ASCII<br>See the definitions in Appendix A of the 7500 Protocol document                                      |
| units       | Engineering units string in printable ASCII.<br>See the definitions in Appendix B of the 7500 Protocol document.                                   |
| prec        | Display value precision.                                                                                                                           |
| math        | Math type field. Vector (V), Scalar (S), Total (T), Minimum (MIN), Maximum (MAX), Standard Deviation (STD), Bitwise OR (OR), No Math (NO).         |
| max         | Maximum measurement value.                                                                                                                         |
| min         | Minimum measurement value.                                                                                                                         |

| Example                                                  |
|----------------------------------------------------------|
| DS 3<cr><br>DS 3,ConcHR,CONC,ug/m3,0,S,10000,-15<cr><lf> |

#### 4.20.3. DS – Request All Descriptor Information

| Command | Description                                                                                                                                     |
|---------|-------------------------------------------------------------------------------------------------------------------------------------------------|
| DS      | This command returns all of the general and header information. The command can be used for devices that have a large serial input buffer size. |

##### Example

```
DS<cr>
DS 1,Time,TIME,,0,NO,0,0
DS 2,ConcRT,CONC,ug/m3,0,S,10000,-15
DS 3,ConcHR,CONC,ug/m3,0,S,10000,-15
DS 4,Flow,FLOW,lpm,1,S,20.0,0.0
DS 5,WS,WS,m/s,1,S,60.0,0.0
DS 6,WD,WD,Deg,0,V,360,0
DS 7,AT,AT,C,1,S,70.0,-50.0
DS 8,RH,RH,%,0,S,100,0
DS 9,BP,BP,mmHg,0,S,825,200
DS 10,FT,AT,C,1,S,70.0,-50.0
DS 11,FRH,RH,%,0,S,100,0
DS 12,BV,BV,V,1,S,16.0,0.0
DS 13,PM,INFO,,0,NO,0,0
DS 14,Status,INFO,,0,OR,0,0
```

#### 4.20.4. DSCRC – Descriptor table CRC

| Command | Description                                                                                                                                                                                                                                                                                                                                              |
|---------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| DSCRC   | <p>This command returns the instrument descriptor table CRC. The intent is for the system or software to query and save this CRC. The value is then compared on subsequent reads to check for any instrument configuration changes.</p> <p>If the CRC does not match the previous CRC then check for a change in the field configuration parameters.</p> |

| Response   | Description                          |
|------------|--------------------------------------|
| DSCRC hhhh | hhhh – The CRC value in hexadecimal. |

| Example                                                   |
|-----------------------------------------------------------|
| <pre>DSCRC&lt;cr&gt; DSCRC 7F61&lt;cr&gt;&lt;lf&gt;</pre> |

#### 4.21. DT – Request or Set the Date and Time

| Command                                     | Description                                            |
|---------------------------------------------|--------------------------------------------------------|
| DT                                          | Request the date and time part of the real time clock. |
| DT yyyyMMddHHmmss<br>DT yyyy-MM-dd HH:mm:ss | Set the date and time part of the real time clock.     |

| Response               |
|------------------------|
| DT yyyy-MM-dd HH:mm:ss |

| Parameter | Description       |
|-----------|-------------------|
| yyyy      | Years 2000 – 2037 |
| MM        | Months 1 – 12     |
| dd        | Days 1 – 31       |
| HH        | Hours 0 – 23      |
| mm        | Minutes 0 – 59    |
| ss        | Seconds 0 – 59    |

| Example                                                                                                                                                                                                               |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| DT<cr><br>DT 2013-01-08 11:39:23<cr><lf><br><br>DT 2013<cr><br>DT 2013-01-01 00:00:00<cr><lf><br><br>DT 20130108<cr><br>DT 2013-08-08 00:00:00<cr><lf><br><br>DT 2013-01-081141<cr><br>DT 2013-01-08 11:41:00<cr><lf> |

#### 4.22. HS – Request or Set the Ethernet Flow Control

| Command | Description                                                  |
|---------|--------------------------------------------------------------|
| HS      | Request the Ethernet flow control.                           |
| HS e    | Set the Ethernet flow control, where e is 0-NONE, 1-RTS/CTS, |

| Response | Description                                                               |
|----------|---------------------------------------------------------------------------|
| HS e-n   | x – The enumerator setting.<br>n – The Ethernet flow control setting name |

| Example                                                             |
|---------------------------------------------------------------------|
| HS<cr><br>HS 0-NONE<cr><lf><br><br>HS 1<cr><br>HS 1-RTS/CTS<cr><lf> |

#### 4.23. ID – Request or Set the Location ID

| Command | Description                                 |
|---------|---------------------------------------------|
| ID      | Request the Location ID.                    |
| ID id   | Set the Location ID. The range is 1 to 999. |

| Response | Description                                                                 |
|----------|-----------------------------------------------------------------------------|
| ID id    | id – The location ID. The ID value is three characters with leading zero's. |

| Example                                                    |
|------------------------------------------------------------|
| ID<cr><br>ID 001<cr><lf><br><br>ID 2<cr><br>ID 002<cr><lf> |

#### 4.24. MA – Request or Set the Modbus Address

| Command | Description                                    |
|---------|------------------------------------------------|
| MA      | Request the Modbus address.                    |
| MA a    | Set the Modbus address. The range is 1 to 247. |

| Response | Description             |
|----------|-------------------------|
| MA a     | a – The Modbus address. |

| Example                                                                                   |
|-------------------------------------------------------------------------------------------|
| <pre>MA&lt;cr&gt; MA 1&lt;cr&gt;&lt;lf&gt;  MA 2&lt;cr&gt; MA 2&lt;cr&gt;&lt;lf&gt;</pre> |

#### 4.25. NW – Set Network Mode

Refer to the **7500 Network Protocol Specification** document for more information.

| Command | Description                                    |
|---------|------------------------------------------------|
| NW      | Request the measurement concentration setting. |
| NW m    | Set the network mode where m is 0-Off, 1-On.   |

| Response | Description |
|----------|-------------|
| NW 0     | .           |

| Example                                                                                                    |
|------------------------------------------------------------------------------------------------------------|
| <pre>NW&lt;cr&gt; NW 0 &lt;cr&gt;&lt;lf&gt;  &lt;Esc&gt;A NW 0*cs&lt;cr&gt; NW 0&lt;cr&gt;&lt;lf&gt;</pre> |

#### 4.26. OI – Request or Set the Output Interval

| Command | Description                                                                                                                                                                                                                                                |
|---------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| OI i    | Set Output Interval. This command is provided for compatibility with 7500 protocol masters which expect to turn off output with this command.<br><br>Where i is the Interval. 0=No volunteered output, 1=Output at end of measurement. Only 0 is supported |

| Response | Description                                                    |
|----------|----------------------------------------------------------------|
| OI 0     | Response is the same whether setting or getting the parameter. |

| Example                                                |
|--------------------------------------------------------|
| OI<cr><br>OI 0<cr><lf><br><br>OI 1<cr><br>OI 0<cr><lf> |

#### 4.27. OP – Request or Set the Operation State

| Command | Description                                                            |
|---------|------------------------------------------------------------------------|
| OP      | Request the current operation state.                                   |
| OP n    | Set the operation state where n is 0=stop operation, 1=start operation |

| Response   | Description                                                               |
|------------|---------------------------------------------------------------------------|
| OP n-state | n – the current state enumerator<br>state – the name of the current state |

| Example                                                                     |
|-----------------------------------------------------------------------------|
| OP<cr><br>OP 1-UNIT OFF<cr><lf><br><br>OP 1<cr><br>OP 3-STARTING...<cr><lf> |

#### 4.28. PM – Request or Set the PM Inlet Type

| Command | Description                                                    |
|---------|----------------------------------------------------------------|
| PM      | Request the current operation state.                           |
| PM e    | Set the PM Inlet type where <i>n</i> is 0-PM2.5, 1-PM10, 2-TSP |

| Response  | Description                                                                            |
|-----------|----------------------------------------------------------------------------------------|
| OP e-name | <i>n</i> – the PM Inlet type enumerator<br><i>name</i> – the name of the PM Inlet type |

##### Example

```
PM<cr>
PM 0-PM2.5<cr><lf>

PM 2<cr>
PM 2-TSPcr><lf>
```

#### 4.29. PR – Print Report

| Command | Description                                                                                        |
|---------|----------------------------------------------------------------------------------------------------|
| PR f    | Print report where <i>f</i> is the file number.<br>0 – Settings<br>1 – Data Log<br>2 – Alarm Log   |
| PR f 0  | Report all the data.                                                                               |
| PR f -1 | Report the new data since the last request.                                                        |
| PR f n  | Report the last <i>n</i> hours where <i>n</i> is less than or equal to 2000.                       |
| PR f ts | Request the last data since timestamp, where <i>ts</i> has the format <i>yyyy-MM-dd HH:mm:ss</i> . |

#### 4.30. PW – Unlock User Commands

| Command | Description                                                                                        |
|---------|----------------------------------------------------------------------------------------------------|
| PW nnnn | This command Unlocked the user protected commands.<br>The command and screen password is the same. |

| Response | Description                                                  |
|----------|--------------------------------------------------------------|
| Unlocked | If the user password is correct, you will see this response. |

| Example                                                   |
|-----------------------------------------------------------|
| <pre>PW 1234&lt;cr&gt; Unlocked&lt;cr&gt;&lt;lf&gt;</pre> |

#### 4.31. QH – Report Data Record Header

| Command | Description                |
|---------|----------------------------|
| QH      | Report data record header. |

| Response                                                                                                                                           |
|----------------------------------------------------------------------------------------------------------------------------------------------------|
| Time, ConcRT (ug/m3) , ConcHR (ug/m3) , Flow (lpm) , WS (m/s) , WD (Deg) , AT (C) , RH (%) ,<br>BP (mmHg) , FT (C) , FRH (%) , BV (V) , PM, Status |

#### 4.32. RQ – Request Last Record

| Command | Description                                   |
|---------|-----------------------------------------------|
| RQ      | Request the instantaneous measurement record. |

Response:

The response is the same as the 4-command.

Example:

```
RQ<cr>
2017-01-17 15:14:39,+000010,+000015,+16.7,00.0,000,+020.7,028,
725,+023.0,020,12.3,0,00000,*04417
```

#### 4.33. RS – Report Settings

| Command | Description          |
|---------|----------------------|
| RS      | Report the settings. |

Response:

The response is the same as the 1-command.

#### 4.34. RV – Report Model, Firmware, Revision

| Command | Description                                                                                                                                                                                                                    |
|---------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| RV      | Request the model number, firmware part number, and revision string.<br><br>Instruments with more than one processor or programmable devices will include more than one part number and revision on the next subsequent lines. |

| Response | Description                                                                           |
|----------|---------------------------------------------------------------------------------------|
| m, p, r  | m – Device model name.<br><br>p – Firmware part number.<br><br>r – Firmware revision. |

| Example                                                                                                    |
|------------------------------------------------------------------------------------------------------------|
| RV<cr><br>E-BAM PLUS, 82102, R1.1.2<cr><lf><br>CPLD, 81699, R1.0.0<cr><lf><br>Display, 82451, R1.0<cr><lf> |

##### 4.34.1. RV 0 – Request the number of processor/devices supported

| Command | Description                                              |
|---------|----------------------------------------------------------|
| RV 0    | Request the number of processor or programmable devices. |

| Response | Description                                   |
|----------|-----------------------------------------------|
| RV n     | n – Number processor or programmable devices. |

| Example                  |
|--------------------------|
| RV 0<cr><br>RV 3<cr><lf> |

#### 4.34.2. **RV n – Request individual processor/device information**

| Command | Description                                                                                                      |
|---------|------------------------------------------------------------------------------------------------------------------|
| RV n    | Request the model number, firmware part number, and revision for a specified processor or programmable device n. |

| Response     | Description                                                                                             |
|--------------|---------------------------------------------------------------------------------------------------------|
| RV e m, p, r | e – Device enumerator.<br>m – Device model name.<br>p – Firmware part number.<br>r – Firmware revision. |

| Example                                                                                                                                    |
|--------------------------------------------------------------------------------------------------------------------------------------------|
| <pre>RV 1&lt;cr&gt; RV 1 E-BAM PLUS, 82102, R1.1.2&lt;cr&gt;&lt;lf&gt;  RV 3&lt;cr&gt; RV 3 Display, 82451, R1.0&lt;cr&gt;&lt;lf&gt;</pre> |

#### 4.35. SB – Request or Set the Serial Baud Rate

| Command | Description                                                                                              |
|---------|----------------------------------------------------------------------------------------------------------|
| SB      | Request the serial baud rate setting.                                                                    |
| SB m    | Set the serial baud rate where m is 2-1200, 3-2400, 4-4800, 5-9600, 6-19200, 7-38400, 8-57600, 9-115200. |

| Response  | Description                                                 |
|-----------|-------------------------------------------------------------|
| SB m-name | m – Serial baud rate enumerator.<br>name – enumerator name. |

| Example                                                                                              |
|------------------------------------------------------------------------------------------------------|
| <pre>SB&lt;cr&gt; SB 5-9600&lt;cr&gt;&lt;lf&gt;  SB 6&lt;cr&gt; SB 6-19200&lt;cr&gt;&lt;lf&gt;</pre> |

#### 4.36. SS – Get the Serial Number

| Command | Description            |
|---------|------------------------|
| SS      | Get the serial number. |

| Response  | Description |
|-----------|-------------|
| SS A99999 |             |

| Example                                               |
|-------------------------------------------------------|
| <pre>SS&lt;cr&gt; SS A99999&lt;cr&gt;&lt;lf&gt;</pre> |

#### 4.37. ST – Request or Set the Sample Time

| Command | Description                                                                                                    |
|---------|----------------------------------------------------------------------------------------------------------------|
| ST      | Request the Sample Time.                                                                                       |
| ST e    | Set the Sample Time.<br>e – the Sample Time, where e is 0-1 MIN, 1-5 MIN, 2-10 MIN, 3-15 MIN, 4-30 MIN, 5-1 HR |

| Response | Description                                                     |
|----------|-----------------------------------------------------------------|
| ST e-v   | e – The enumerator value.<br>v – The current sample time value. |

| Example                                                           |
|-------------------------------------------------------------------|
| ST<cr><br>ST 5-1 HR<cr><lf><br><br>ST 1<cr><br>ST 1-5 Min<cr><lf> |

#### 4.38. TS – Request or Set the Timestamp Mode

| Command | Description                                                       |
|---------|-------------------------------------------------------------------|
| TS      | Request the Timestamp Mode setting.                               |
| TS e    | Set the Timestamp Mode setting, where e is 0-ENDING, 1-BEGINNING. |

| Response  | Description                                                |
|-----------|------------------------------------------------------------|
| TS e-name | e – The enumerator setting.<br>name – The enumerator name. |

| Example                                                                 |
|-------------------------------------------------------------------------|
| TS<cr><br>TS 1-BEGINNING<cr><lf><br><br>TS 0<cr><br>TS 0-ENDING<cr><lf> |

#### 4.39. UN c – Request Specific Channel Available Field Units

| Command | Description                                                                     |
|---------|---------------------------------------------------------------------------------|
| UN c    | Request the list of available channel/field units.<br>c – Desired channel/field |

| Response         | Description                                                                                                                                                                                                                                                |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| UN c e-name, ... | Returns the available units for the channel/field units.<br>1-a – The enumerator and name<br>... – More enumerators and names<br>If a field has no units associated with it, a single response with an enumerator of 0 is returned with a unit name of N/A |

| Example                                                                        |
|--------------------------------------------------------------------------------|
| UN 2<cr><br>UN 2 1-ug/m3,2-mg/m3<cr><lf><br><br>UN 1<cr><br>UN 1 0-N/A<cr><lf> |

#### 4.40. UN c u – Set Specific Channel Field Units

| Command | Description                                                                                                                                                                                                                                             |
|---------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| UN c u  | <p>Set the channel/field units.</p> <p>c        – Desired channel/field</p> <p>u        – Enumerated unit (1, 2, 3 etc.)</p> <p>Enumerators are 1 based. Sending a 0 enumerator to this command will echo back the current setting with no changes.</p> |

| Response    | Description                                                                                                                                               |
|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
| UN c e-name | <p>Returns the enumerator and unit name after the change.</p> <p>c                – channel/field</p> <p>e-name        – The enumerator and unit name</p> |

| Example                                                                                                               |
|-----------------------------------------------------------------------------------------------------------------------|
| <pre>UN 2&lt;cr&gt; UN 2 1-ug/m3,2-mg/m3&lt;cr&gt;&lt;lf&gt;  UN 2 2&lt;cr&gt; UN 2 2-mg/m3&lt;cr&gt;&lt;lf&gt;</pre> |

#### 4.41. AIR – Request or Set the AIRSIS Protocol Enable

| Command | Description                                                     |
|---------|-----------------------------------------------------------------|
| AIR     | Request the AIRSIS Protocol Enable setting.                     |
| AIR e   | Set the AIRSIS Protocol Enable setting, where e is 0-OFF, 1-ON. |

| Response   | Description                                                |
|------------|------------------------------------------------------------|
| AIR e-name | e – The enumerator setting.<br>name – The enumerator name. |

| Example                                                           |
|-------------------------------------------------------------------|
| AIR<cr><br>AIR 0-OFF<cr><lf><br><br>AIR 1<cr><br>AIR 1-ON<cr><lf> |

#### 4.42. SPW – Request or Set the User Password

| Command  | Description                                                                                   |
|----------|-----------------------------------------------------------------------------------------------|
| SPW      | Request the user password.                                                                    |
| SPW wxyz | Set the user password, where <i>w</i> , <i>y</i> , <i>x</i> , <i>z</i> are digits from 1 – 9. |

| Response | Description                                                                  |
|----------|------------------------------------------------------------------------------|
| SPW ---- | ---- - The user password has not been entered and therefore cannot be shown. |
| SPW wxyz | wxyz – The current user password.                                            |

| Example                                                                                                                                                                                              |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <pre>SPW&lt;cr&gt; SPW ----&lt;cr&gt;&lt;lf&gt;  PW 1234&lt;cr&gt; PW Unlocked&lt;cr&gt;&lt;lf&gt; SPW&lt;cr&gt; SPW 1234&lt;cr&gt;&lt;lf&gt;  SPW 1122&lt;cr&gt; SPW 1122&lt;cr&gt;&lt;lf&gt;</pre> |

#### 4.43. TZO – Request or Set the Time Zone Offset

| Command   | Description                                                                                    |
|-----------|------------------------------------------------------------------------------------------------|
| TZO HH:mm | Get/Set the Time Zone Offset.<br>HH – Offset hours, -12 to 14<br>mm – Offset minutes, 00 to 59 |

| Response       | Description                                                                       |
|----------------|-----------------------------------------------------------------------------------|
| TZO UTC +HH:mm | + - Sign of the hours<br>HH – Current Offset Hours<br>mm – Current Offset Minutes |

| Example                                                                         |
|---------------------------------------------------------------------------------|
| TZO<cr><br>TZO UTC +00:00<cr><lf><br><br>TZO 8:13<cr><br>TZO UTC +08:13<cr><lf> |

#### 4.44. XRD – Request the Xmodem Record Descriptors

Refer to the ***File Record Descriptor Specification*** document for more information.

| Command | Description                                                            |
|---------|------------------------------------------------------------------------|
| XRD e   | Request the X-modem record descriptors, where e is 1=data file record. |

| Response | Description                                                                                                                                         |
|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------|
|          | Go to Wikipedia for more information on the XMODEM protocol – <a href="http://en.wikipedia.org/wiki/XMODEM">http://en.wikipedia.org/wiki/XMODEM</a> |

| Example                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <pre>XRD 1&lt;cr&gt; XRD 1,2,14,1,LE 1,Time,,0,NO,DATETIME,1.0E+00,0.0E+00 2,Status,,0,OR,UINT32,1.0E+00,0.0E+00 3,ConcRT,ug/m3,0,S,FLOAT,1.0E+03,0.0E+00 4,ConcHR,ug/m3,0,TOH,FLOAT,1.0E+03,0.0E+00 5,FLOW,LPM,1,S,FLOAT,1.0E+00,0.0E+00 6,WS,m/s,1,S,FLOAT,1.0E+00,0.0E+00 7,WD,Deg,0,V,FLOAT,1.0E+00,0.0E+00 8,AT,C,1,S,FLOAT,1.0E+00,0.0E+00 9,RH,%,0,S,FLOAT,1.0E+00,0.0E+00 10,BP,mmHg,0,S,FLOAT,1.0E+00,0.0E+00 11,FT,C,1,S,FLOAT,1.0E+00,0.0E+00 12,FRH,%,0,S,FLOAT,1.0E+00,0.0E+00 13,BV,V,1,S,FLOAT,1.0E+00,0.0E+00 14,PM,,0,NO,UINT32,1.0E+00,0.0E+00</pre> |

#### 4.45. XRF – Xmodem Read File

Refer to the *File Record Descriptor Specification* document for more information.

| Command            | Description                                                                                                                                                                  |
|--------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| XRF <i>e ts te</i> | Request the data file in binary xmodem protocol where <i>e</i> is 1=data file and <i>ts</i> (optional) is the start timestamp and <i>te</i> (optional) is the end timestamp. |

| Response | Description |
|----------|-------------|
|          |             |

#### 4.46. BKGD – Request or Set the Background Offset

| Command       | Description                                                                |
|---------------|----------------------------------------------------------------------------|
| BKGD          | Request the background offset setting.                                     |
| BKGD <i>n</i> | Set the background offset setting, where <i>n</i> is from -0.050 to 0.050. |

| Response      | Description                                    |
|---------------|------------------------------------------------|
| BKGD <i>n</i> | <i>n</i> – the background offset setting value |

| Example                                                                                                        |
|----------------------------------------------------------------------------------------------------------------|
| <pre>BKGD&lt;cr&gt; BKGD 0.0000&lt;cr&gt;&lt;lf&gt;  BKGD 0.035&lt;cr&gt; BKGD 0.035&lt;cr&gt;&lt;lf&gt;</pre> |

#### 4.47. FTSP – Request or Set the Filter Temperature Set Point

| Command | Description                                                        |
|---------|--------------------------------------------------------------------|
| FTSP    | Request the filter temperature set point.                          |
| FTSP n  | Set the filter temperature set point, where n is from 0.0 to 50.0. |

| Response | Description                                |
|----------|--------------------------------------------|
| FTSP n   | n – the filter temperature set point value |

##### Example

```
FTSP <cr>
FTSP 45.0<cr><lf>

FTSP 35<cr>
FTSP 35.0<cr><lf>
```

#### 4.48. SPAN – Request or Set the Span Calibration Verification

| Command | Description                                                        |
|---------|--------------------------------------------------------------------|
| SPAN    | Request the span calibration verification value.                   |
| SPAN n  | Set the span calibration verification, where n is from 0.4 to 2.0. |

| Response | Description                                  |
|----------|----------------------------------------------|
| SPAN n   | n – the span calibration verification value. |

##### Example

```
SPAN<cr>
SPAN 0.780<cr><lf>

SPAN 1<cr>
SPAN 1.000<cr><lf>
```

#### 4.49. STDT – Request or Set the Standard Temperature

| Command | Description                                                     |
|---------|-----------------------------------------------------------------|
| STDT    | Request standard temperature.                                   |
| STDT e  | Set the standard temperature, where e is 0-0 C, 1-20 C, 2-25 C. |

| Response | Description                                                                        |
|----------|------------------------------------------------------------------------------------|
| STDT e-n | e – the standard temperature enumerator<br>n – the standard temperature value name |

| Example                                                                   |
|---------------------------------------------------------------------------|
| STDT <cr><br>STDT 2-25 C<cr><lf><br><br>STDT 1<cr><br>STDT 1-20 C<cr><lf> |

#### 4.50. DSCRC – Channel Descriptor table CRC

| Command | Description                                                                                                                                                                                                                                                                                                                                    |
|---------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| DSCRC   | This command returns the channel descriptor table CRC. The intent is for the system or software to query and save this CRC. The value is then compared on subsequent reads to check for any instrument configuration changes.<br><br>If the CRC does not match the previous CRC then check for a change in the field configuration parameters. |

| Response   | Description                          |
|------------|--------------------------------------|
| DSCRC hhhh | hhhh – The CRC value in hexadecimal. |

| Example                         |
|---------------------------------|
| DSCRC<cr><br>DSCRC F69F<cr><lf> |

#### 4.51. MODEM – Request or Set the Modem Connection Type

| Command | Description                                                                                    |
|---------|------------------------------------------------------------------------------------------------|
| MODEM e | Get/Set the modem connection type<br>e – enumerator for connection type, 0-NONE, 1-GSM, 2-CDMA |

| Response  | Description                                           |
|-----------|-------------------------------------------------------|
| MODEM e-n | e – enumerator setting<br>n – name of connection type |

| Example                                                                     |
|-----------------------------------------------------------------------------|
| MODEM<cr><br>MODEM 0-NONE<cr><lf><br><br>MODEM 1<cr><br>MODEM 1-GSM<cr><lf> |

#### 4.52. RTPER – Request or Set the Real-time Average Period

| Command | Description                                                 |
|---------|-------------------------------------------------------------|
| RTPER   | Request the real-time average period.                       |
| RTPER n | Set the real-time average period, where n is from 15 to 60. |

| Response | Description                                  |
|----------|----------------------------------------------|
| RTPER n  | n – the span calibration verification value. |

| Example                                                                |
|------------------------------------------------------------------------|
| RTPER <cr><br>RTPER 60<cr><lf><br><br>RTPER 30<cr><br>RTPER 30<cr><lf> |

#### 4.53. TPRES – Request or Set the Tape Advanced Pressure

| Command | Description                                                        |
|---------|--------------------------------------------------------------------|
| TPRES   | Request the tape advanced pressure setting.                        |
| TPRES n | Set the tape advanced pressure setting, where n is from 50 to 350. |

| Response | Description                             |
|----------|-----------------------------------------|
| TPRES n  | n – the tape advanced pressure setting. |

| Example                                                                   |
|---------------------------------------------------------------------------|
| TPRES <cr><br>TPRES 250<cr><lf><br><br>TPRES 150<cr><br>TPRES 150<cr><lf> |

#### 4.54. XRDCRC – Request the Xmodem File Descriptor CRC

Refer to the *File Record Descriptor Specification* document for more information.

| Command  | Description                      |
|----------|----------------------------------|
| XRDCRC 1 | Request the file descriptor CRC. |

| Response      | Description                                                                         |
|---------------|-------------------------------------------------------------------------------------|
| XRDCRC f hhhh | f – the file number.<br>hhhh – the file record descriptor CRC value in hexadecimal. |

| Example                               |
|---------------------------------------|
| XRDCRC 1<cr><br>XRDCRC 1 7923<cr><lf> |

#### 4.55. CLKSUNC – Request or Set the Clock Sync Mode

| Command   | Description                                          |
|-----------|------------------------------------------------------|
| CLKSYNC   | Request the clock sync mode.                         |
| CLKSYNC e | Set the clock sync mode, where e is 0-NONE, 1-CLOUD. |

| Response       | Description                                                        |
|----------------|--------------------------------------------------------------------|
| CLKSYNC e-name | e – the clock sync mode enumerator.<br>name – the enumerator name. |

| Example                                                                                                                  |
|--------------------------------------------------------------------------------------------------------------------------|
| <pre>CLKSYNC&lt;cr&gt; CLKSYNC 0-NONE&lt;cr&gt;&lt;lf&gt;  CLKSYNC 1&lt;cr&gt; CLKSYNC 1-CLOUD&lt;cr&gt;&lt;lf&gt;</pre> |

## 5. Modbus Map

This section will cover the E-BAM PLUS Modbus Map.

### 5.1. 3x Modbus Map

| Name             | Address | Type    | Points | Description                                         |
|------------------|---------|---------|--------|-----------------------------------------------------|
| Word             | 0       | Uint16  | 1      | Fixed value of 1                                    |
| Dword            | 1       | Uint32  | 2      | Fixed value of 123456789                            |
| Float            | 3       | Float32 | 2      | Fixed value of 123456.0                             |
| String           | 5       | String  | 3      | Fixed value of "ABCDE"                              |
|                  |         |         |        |                                                     |
| Year             | 100     | Uint16  | 1      | Current time Year                                   |
| Month            | 101     | Uint16  | 1      | Current time Month                                  |
| Day              | 102     | Uint16  | 1      | Current time Day                                    |
| Hour             | 103     | Uint16  | 1      | Current time Hour                                   |
| Minute           | 104     | Uint16  | 1      | Current time Minute                                 |
| Second           | 105     | Uint16  | 1      | Current time Second                                 |
| Date/Time        | 106     | Uint32  | 2      | Current Unix time (Seconds since Jan 1 1970)        |
|                  |         |         |        |                                                     |
| N Channel        | 200     | Uint16  | 1      | Number of channels in last data record              |
| Serial Number    | 201     | String  | 5      | MOI serial number (10 Bytes including 0 terminator) |
| Revision         | 206     | String  | 20     | Product Model, part number, and revision            |
| Digital Revision | 226     | String  | 20     | Digital sensor Model, part number, and revision     |

## Instantaneous real time readings

| Name      | Address | Type   | Points | Description                                    |
|-----------|---------|--------|--------|------------------------------------------------|
| Date/Time | 1000    | Uint32 | 2      | Current Unix time (Seconds since Jan 1 1970)   |
| Status    | 1002    | Uint32 | 2      | Current alarm status                           |
| Conc RT   | 1004    | Float  | 2      | Real time concentration (ug/m3 or mg/m3)       |
| Conc HR   | 1006    | Float  | 2      | Previous hour's concentration (ug/m3 or mg/m3) |
| Flow1     | 1008    | Float  | 2      | (LPM) Total flow rate                          |
| Flow2     | 1010    | Float  | 2      | (LPM) Sheath flow rate                         |
| WS        | 1012    | Float  | 2      | (m/s) Wind Speed                               |
| WD        | 1014    | Float  | 2      | (Deg) Wind Direction                           |
| AT        | 1016    | Float  | 2      | (C) Ambient temperature                        |
| RH        | 1018    | Float  | 2      | (%) External relative humidity                 |
| BP        | 1020    | Float  | 2      | (mmHg) Barometric pressure                     |
| PX1       | 1022    | Float  | 2      | (mmHg) Upper tape pressure                     |
| PX2       | 1024    | Float  | 2      | (mmHg) Lower tape pressure                     |
| FT        | 1026    | Float  | 2      | (C) Filter temperature                         |
| FRH       | 1028    | Float  | 2      | (%) Filter relative humidity                   |
| BXT       | 1030    | Float  | 2      | (C) Box temperature                            |
| BV        | 1032    | Float  | 2      | (V) Battery voltage                            |
| Flow      | 1034    | Float  | 2      | (LPM) Sample flow rate                         |
| Beta      | 1036    | Float  | 2      | (Hz) Beta counts                               |

### Last data record readings

| Name      | Address | Type   | Points | Description                                    |
|-----------|---------|--------|--------|------------------------------------------------|
| Date/Time | 2000    | UInt32 | 2      | Unix timestamp (Seconds since Jan 1 1970)      |
| Status    | 2002    | UInt32 | 2      | Alarm status                                   |
| Conc RT   | 2004    | Float  | 2      | Real time concentration (ug/m3 or mg/m3)       |
| Conc HR   | 2006    | Float  | 2      | Previous hour's concentration (ug/m3 or mg/m3) |
| Flow      | 2008    | Float  | 2      | (LPM) Flow rate                                |
| WS        | 2010    | Float  | 2      | (m/s) Wind speed                               |
| WD        | 2012    | Float  | 2      | (Deg) Wind direction                           |
| AT        | 2014    | Float  | 2      | (C) Ambient temperature                        |
| RH        | 2016    | Float  | 2      | (%) External relative humidity                 |
| BP        | 2018    | Float  | 2      | (mmHg) Barometric pressure                     |
| FT        | 2020    | Float  | 2      | (C) Filter temperature                         |
| FRH       | 2022    | Float  | 2      | (%) Filter relative humidity                   |
| BV        | 2024    | Float  | 2      | (V) Battery voltage                            |
| PM Type   | 2026    | Unit32 | 2      | PM Inlet type                                  |



## 5.2. 4x Modbus Map

| Name                    | Address | Type   | Points | Description                              |
|-------------------------|---------|--------|--------|------------------------------------------|
| Modbus Address          | 0       | Int16  | 1      | Modbus address                           |
| Byte Order <sup>1</sup> | 1       | Int16  | 1      | Value 1 to 4                             |
|                         |         |        |        |                                          |
| Year                    | 100     | UInt16 | 1      | Set time Year (YYYY)                     |
| Month                   | 101     | UInt16 | 1      | Set time Month                           |
| Day                     | 102     | UInt16 | 1      | Set time Day                             |
| Hour                    | 103     | UInt16 | 1      | Set time Hour                            |
| Minute                  | 104     | UInt16 | 1      | Set time Minute                          |
| Second                  | 105     | UInt16 | 1      | Set time Second                          |
| Date/Time               | 106     | UInt32 | 2      | Set Unix time (Seconds since Jan 1 1970) |

<sup>1</sup> For more information on Byte Order refer to **Interfacing with Modbus** document.